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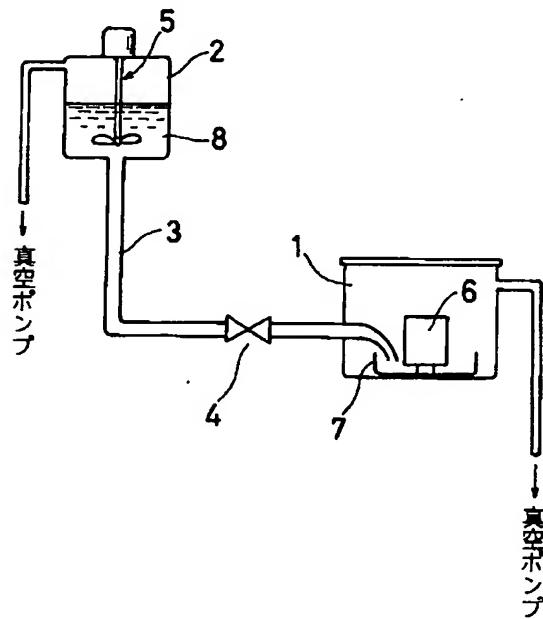
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(54)【発明の名称】 動圧軸受の製造方法

(57)【要約】

【課題】 動圧軸受内への潤滑流体の封入作業の能率化と、潤滑流体封入後の動圧軸受内に空気の混入を確実に防止することのできる動圧軸受の製造方法を提供する。

【解決手段】 開閉弁3を介して連通する2つの真空チャンバ1、2を用意し、開閉弁4を閉じた状態で一方の真空チャンバ1に動圧軸受6を配置して脱気とともに、他方の真空チャンバ2内に潤滑流体8を収容して攪拌脱気する。各チャンバ1、2内の圧力が所要圧にまで脱気された後、開閉弁4を開いて他方の真空チャンバ2内の潤滑流体8を第1の真空チャンバ1内に導き、その潤滑流体8を動圧軸受6内に充填させることで、1つの動圧軸受6を処理することに大気に曝す必要のある一方の真空チャンバ1の脱気を、潤滑流体8の不存在下で行うことを可能としてその所要時間を短縮化し、かつ、潤滑流体8を収容する他方の真空チャンバ2については、大気に曝されることがなく、攪拌脱気を行うことと併せて潤滑流体8内の空気を確実に除去することを可能とする。



## 【特許請求の範囲】

【請求項1】 動圧軸受の内部隙間に潤滑流体を充填するに当たり、開閉弁を介して互いに連通する2つの真空チャンバ用い、開閉弁を閉じた状態で一方のチャンバに動圧軸受を収容して真空脱気するとともに、他方のチャンバに潤滑流体を収容して攪拌脱気した後、開閉弁を開いて上記一方のチャンバ内に潤滑流体を導くことにより、その潤滑流体を上記内部隙間の開口部を通じて動圧軸受内に充填することを特徴とする動圧軸受の製造方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は動圧軸受の製造方法に関し、更に詳しくは、動圧軸受の内部への潤滑流体の充填を確実かつ能率的に行うことのできる動圧軸受の製造方法に関する。

## 【0002】

【従来の技術】 動圧軸受においては、一般に、円筒体の内面とその内部に挿入された軸の外面や、端面どうし等、軸受を構成する2つの面のいずれか一方に動圧溝を形成し、その間にオイル等の潤滑流体を封入した構造を探る。そして、円筒体と軸などの部材間の相対回転時に動圧溝のポンピング作用等によって潤滑流体の膜圧を発生させ、その流体膜圧によって部材間を非接触状態としつつ相対回転させることを可能とする。

【0003】 このような動圧軸受においては、従って、軸受を構成する部材を組み立てた後に、その部材間の隙間に、空気を含むことなくオイル等の潤滑流体を封入する必要がある。潤滑流体を動圧軸受内に封入すべく、部材間の隙間に潤滑流体を充填する方法として、従来、図2に模式的に示す方法が知られている。

【0004】 すなわち、この従来方法では、真空チャンバ21内に潤滑流体22を収容するとともに、その上方に、内部隙間を有する動圧軸受23を吊り下げ、その状態で真空ポンプによりチャンバ21内を脱気し、その後、動圧軸受23を下降させて潤滑流体22に浸すことにより、潤滑流体22が上記内部隙間の開口部を通じて動圧軸受23内に入り込み、その内部隙間が潤滑流体によって充たされる。その後、真空チャンバ21を開放して大気圧として動圧軸受23を取り出すことにより、内部隙間に潤滑流体が封入された動圧軸受が得られる。

## 【0005】

【発明が解決しようとする課題】 ところで、以上のような従来の潤滑流体の充填方法によると、真空チャンバ21内に潤滑流体22を収容した状態でその内部の真空脱気を行うために、真空チャンバ21内が所要の真空度に達するまでに長時間を要するという問題がある。この真空チャンバ21内の脱気は、1つの動圧軸受23を処理することに行う必要があるため、その作業能率は相当に低いものとなる。しかも、このような従来の方法におい

ては、潤滑流体の内部の空気を取りきれない場合があり、潤滑流体封入後の動圧軸受の品質の点において問題があった。

【0006】 本発明はこのような実情に鑑みてなされたもので、動圧軸受内への潤滑流体の封入作業の能率化を達成し、しかも潤滑流体封入後の動圧軸受内への空気の混入を確実に防止することのできる動圧軸受の製造方法の提供を目的としている。

## 【0007】

【課題を解決するための手段】 上記の目的を達成するため、本発明の動圧軸受の製造方法は、動圧軸受の内部隙間に潤滑流体を充填するに当たり、開閉弁を介して互いに連通する2つの真空チャンバ用い、開閉弁を閉じた状態で一方のチャンバに動圧軸受を収容して真空脱気するとともに、他方のチャンバに潤滑流体を収容して攪拌脱気した後、開閉弁を開いて上記一方のチャンバ内に潤滑流体を導くことにより、その潤滑流体を上記内部隙間の開口部を通じて動圧軸受内に充填することによって特徴づけられる。

【0008】 本発明は、動圧軸受と潤滑流体とを個別に脱気することによって、動圧軸受を収容する真空チャンバ内の脱気を要する時間を短縮化するとともに、潤滑流体についてはチャンバ内で攪拌しつつ脱気したものを、開閉弁を開いて動圧軸受側に供給することで、内部の空気が確実に取り除かれた潤滑流体を動圧軸受内に充填することを可能としている。

【0009】 すなわち、本発明においては、開閉弁で仕切られた2つの真空チャンバ用いて、一方の真空チャンバには動圧軸受のみを収容して真空脱気を行う。これにより、動圧軸受と潤滑流体とを収容して真空チャンバ内の脱気を行う従来の方法に比して、チャンバ内を所要の真空度にまで達するのに要する時間を大幅に短縮化することができる。また、他方の真空チャンバには潤滑流体を収容して攪拌脱気を行うことで、その内部の空気を確実に除去することを可能とする。そして、各チャンバ内を脱気した状態で開閉弁を開き、動圧軸受を収容している真空チャンバ内に必要な量の潤滑流体を供給することにより、動圧軸受の内部隙間に開口部を通じて潤滑流体を充填する。

【0010】 ここで、本発明において、潤滑流体を収容している他方の真空チャンバは、動圧軸受を収容して脱気されている一方の真空チャンバに対して所要量の潤滑流体を供給した後に開閉弁を閉じることで、動圧軸受の交換時においても大気圧に曝されることがないため、当初の脱気にのみ従来方法と同等の時間を要するものの、動圧軸受の交換ごとの脱気は殆ど必要がないと同時に、攪拌脱気を行うことと併せて、潤滑流体内の空気を確実に取り除くことができる。

【0011】 なお、本発明において、開閉弁を開くことによって他方の真空チャンバ内の潤滑流体を一方の真空

チャンバ内に供給する手段としては、チャンバ相互の圧力差および／またはチャンバ相互の位置（高低）に基づく重力を利用することができる。

【0012】

【発明の実施の形態】以下、図面を参照しつつ本発明の実施の形態について説明する。図1は本発明方法を適用して動圧軸受内に潤滑流体を充填する工程に用いる装置の構成を示す模式図である。

【0013】第1の真空チャンバ1と、その斜め上方に配置された第2の真空チャンバ2とは、配管3を介して連通しているとともに、その配管3には開閉弁4が設けられており、この開閉弁4を開閉することによって、第1の真空チャンバ1と第2の真空チャンバ2とを連通状態または遮断状態のいずれかの状態とすることができます。また、第1の真空チャンバ1および第2の真空チャンバ2は、それぞれ個別の真空ポンプ（いずれも図示せず）によってその内部を脱気することができます。更に、第2の真空チャンバ2には攪拌装置5が設けられている。

【0014】次に、以上の装置を用いて動圧軸受6内に潤滑流体7を充填する手順について説明する。第1の真空チャンバ1内に、内部隙間に有する動圧軸受6を、内部隙間の開口部位を下に向けてトレイ7上に載せた状態で配置するとともに、第2の真空チャンバ2内には潤滑流体8を収容し、開閉弁4を閉じた状態で両チャンバ1、2内を脱気する。その際、第1の真空チャンバ1内に配置するトレイ7は、その上方に配管3の先端開口部が位置するように位置決めするとともに、第2の真空チャンバ2の攪拌装置5を駆動し、潤滑流体8を攪拌脱気する。

【0015】各真空チャンバ1、2内がそれそれにあらかじめ設定されている圧力にまで脱気された後、開閉弁4を開く。ここで、第1の真空チャンバ1の設定圧力は、第2の真空チャンバ2の設定圧力に対して同等もしくは若干低くすることにより、開閉弁4を開いたとき、第2の真空チャンバ2内の潤滑流体8が、重力と、両チャンバ1、2に圧力差をつけている場合にはそれに加えてその圧力差によって第1の真空チャンバ1側へと流れ、トレイ7内に流入する。トレイ7内に流入した潤滑流体8は、動圧軸受6の開口部を介して内部隙間内へと入り込んでいく。

【0016】第2の真空チャンバ2内の潤滑流体8のトレイ7への流入量が、動圧軸受6の内部隙間を十分に満たすだけの量に達したことを、例えばあらかじめ設定されている開閉弁4の開放時間等によって認識した後、開閉弁4を閉じる。その後、第1の真空チャンバ1を開放してその内部を大気圧とし、動圧軸受6をトレイ7ごと取り出すとともに、次の動圧軸受6を上記と同様にして乾いたトレイ7上に載せた状態で第1の真空チャンバ1内に配置し、この第1の真空チャンバ1の脱気を開始

し、上記と同じ手順を繰り返す。

【0017】以上の実施の形態において特に注目すべき点は、潤滑流体8は第2の真空チャンバ2内に収容されて攪拌脱気され、かつ、この第2の真空チャンバ2は、第1の真空チャンバ1内が脱気された状態でのみ開閉弁4を通じて当該第1の真空チャンバ1に連通するとともに、第1の真空チャンバ1内の脱気時にはその内部に潤滑流体8が存在しない点であり、これにより、大気圧と真空脱気体とを繰り返す必要のある第1の真空チャンバ1を所要圧力までの脱気に要する時間が、潤滑流体を収容した状態で脱気する従来方法に比して大幅に短縮化され、しかも潤滑流体8を収容している第2の真空チャンバ2は、工程中において大気に曝されることがないため、当初に所要の圧力にまで潤滑流体8を攪拌しつつ脱気をしておけば後は殆ど脱気をする必要がなくなると同時に、潤滑流体8内の空気をほぼ完全に取り除くことができ、内部隙間に空気の存在しない高品質の動圧軸受が得られる。

【0018】

20 【発明の効果】以上のように、本発明によれば、動圧軸受の内部隙間に潤滑流体を充填するに当たって、開閉弁を介して連通する2つの真空チャンバを用い、開閉弁を閉じた状態で、一方の真空チャンバには動圧軸受を配置して脱気するとともに、他方の真空チャンバには潤滑流体を収容して攪拌脱気し、双方のチャンバが脱気された状態で開閉弁を開いて他方の真空チャンバ内の潤滑流体を一方の真空チャンバ内へと導いて動圧軸受内に充填するので、1つの動圧軸受を処理することに大気に曝す必要のある一方の真空チャンバについては、潤滑流体が存在しない状態で脱気することができ、動圧軸受と潤滑流体を収容した状態で脱気する従来方法に比して、所要の圧力にまで脱気するための時間を大幅に短縮化することができ、作業の能率化を達成することができる。

30 【0019】また、潤滑流体を収容する他方の真空チャンバについては、1つの動圧軸受の処理ごとに大気に曝されることがなくなるため、当初に所要の圧力にまで脱気した後は殆ど脱気をする必要がなくなり、潤滑流体は攪拌脱気されることと併せて、内部の空気を確実に取り除くことができ、内部隙間に空気の存在しない高品質の動圧軸受を得ることができる。

【図面の簡単な説明】

【図1】本発明方法を適用して動圧軸受内に潤滑流体を充填する工程に用いる装置の構成を示す模式図である。

【図2】動圧軸受内に潤滑流体を充填する従来の工程に用いる装置の構成を示す模式図である。

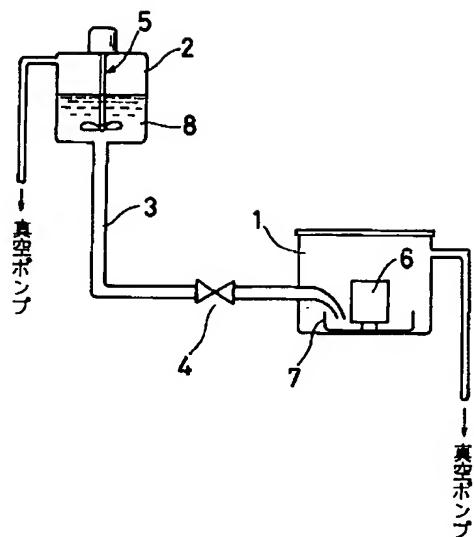
【符号の説明】

- 1 第1の真空チャンバ
- 2 第2の真空チャンバ
- 3 配管
- 4 開閉弁

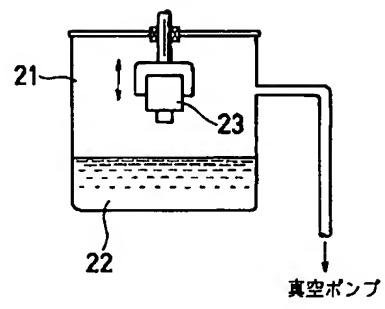
5 搅拌装置  
6 動圧軸受

\* 7 レイ  
\* 8 潤滑流体

【図1】



【図2】



# PATENT ABSTRACTS OF JAPAN

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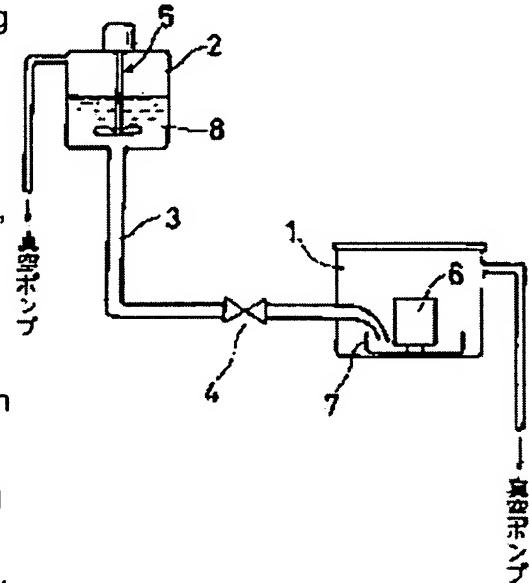
(22) Date of filing : 19.01.2001 (72) Inventor : TAKAHASHI TAKESHI

## (54) METHOD OF MANUFACTURING DYNAMIC PRESSURE BEARING

### (57) Abstract:

**PROBLEM TO BE SOLVED:** To provide a manufacturing method of a dynamic pressure bearing, capable of increasing efficiency of sealing work of a lubricating fluid in the dynamic pressure bearing, and capable of surely preventing mixing of air in the dynamic pressure bearing, after sealing the lubricating fluid.

**SOLUTION:** Two vacuum chambers 1 and 2 communicated via an opening-closing valve 3 are prepared. The dynamic pressure bearing 6 is arranged in one vacuum chamber 1, in a state of closing the opening-closing valve 4 to be evacuated. The lubricating fluid 8 is housed in the other vacuum chamber 2 to be agitated and deaerated. After evacuating the chambers 1 and 2 up to the required pressure, the lubricating fluid 8 in the other vacuum chamber 2 is introduced into the first vacuum chamber 1 by opening the opening-closing valve 4, the lubricating fluid 8 is filled in the dynamic pressure bearing 6, and each time one dynamic pressure bearing 6 is processed, one vacuum chamber 1 required to be exposed to the atmosphere can be evacuated in the absence of the lubricating fluid 8 to shorten the required time. The other vacuum chamber 2 for housing the lubricating fluid 8 is not exposed to the atmosphere, so that air in the lubricating fluid 8 can be surely removed while performing agitation and deaeration.



**LEGAL STATUS**

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**CLAIMS**

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[Claim(s)]

[Claim 1] Where a closing motion valve is closed, while holding and carrying out the vacuum deairing of the hydrodynamic bearing to one chamber using two vacuum chambers which are mutually open for free passage through a closing motion valve in filling up the internal clearance between hydrodynamic bearings with a lubrication fluid The manufacture approach of the hydrodynamic bearing characterized by being filled up with the lubrication fluid in a hydrodynamic bearing through opening of the above-mentioned internal clearance by opening a closing motion valve and leading a lubrication fluid in the chamber of the method of top Norikazu after holding a lubrication fluid in the chamber of another side and carrying out

stirring deaeration.

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[Translation done.]

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of the hydrodynamic bearing which can be filled up with the lubrication fluid inside a hydrodynamic bearing certainly and efficiently in more detail about the manufacture approach of a hydrodynamic bearing.

[0002]

[Description of the Prior Art] In a hydrodynamic bearing, generally a dynamic pressure slot is formed in the inside of a cylinder object, the external surface of the shaft inserted in the interior, or two fields that constitute bearing, such as end faces, and the structure which enclosed lubrication fluids, such as oil, between them is taken. And it makes it possible to carry out relative rotation, generating the film pressure of a lubrication fluid according to a pumping operation of a dynamic pressure slot etc. at the time of the relative rotation between members, such as a cylinder object and a shaft, and making between members into a non-contact condition according to the fluid film pressure force.

[0003] After assembling the member which constitutes bearing, it is necessary to enclose [ in / therefore / such a hydrodynamic bearing ] lubrication fluids, such as oil, with the clearance between the member, without including air. The approach typically shown in drawing 2 is conventionally learned as an approach of filling up the clearance between members with a lubrication fluid that a lubrication fluid should be enclosed in a hydrodynamic bearing.

[0004] That is, while holding the lubrication fluid 22 in the vacuum chamber 21, by hanging the hydrodynamic bearing 23 which has an internal clearance, deaerating the inside of a chamber

21 with a vacuum pump in that condition, dropping a hydrodynamic bearing 23 after that and dipping in the lubrication fluid 22, the lubrication fluid 22 enters in a hydrodynamic bearing 23 through opening of the above-mentioned internal clearance, and that internal clearance is filled with this conventional approach by the lubrication fluid in that upper part. Then, the hydrodynamic bearing by which the lubrication fluid was enclosed with the internal clearance is obtained by opening the vacuum chamber 21 wide and taking out a hydrodynamic bearing 23 as atmospheric pressure.

[0005]

[Problem(s) to be Solved by the Invention] By the way, where the lubrication fluid 22 is held in the vacuum chamber 21, in order to perform the vacuum deairing of the interior according to the restoration approach of the above conventional lubrication fluids, there is a problem of taking long duration for the inside of the vacuum chamber 21 to reach a necessary degree of vacuum. Since it is necessary to perform it whenever degassing in this vacuum chamber 21 processes one hydrodynamic bearing 23, that working capacity will become fairly low. And in such a conventional approach, taking the air inside a lubrication fluid may be unable to be finished and there was a problem in the point of the quality of the hydrodynamic bearing after lubrication fluid enclosure.

[0006] This invention was made in view of such the actual condition, attains the promotion of efficiency of enclosure of the lubrication fluid into a hydrodynamic bearing, and aims at offer of the manufacture approach of the hydrodynamic bearing which can moreover prevent certainly mixing of the air into the hydrodynamic bearing after lubrication fluid enclosure.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the manufacture approach of the hydrodynamic bearing of this invention Where a closing motion valve is closed, while holding and carrying out the vacuum deairing of the hydrodynamic bearing to one chamber using two vacuum chambers which are mutually open for free passage through a closing motion valve in filling up the internal clearance between hydrodynamic bearings with a lubrication fluid After holding a lubrication fluid in the chamber of another side and carrying out stirring deaeration, it characterizes by being filled up with the lubrication fluid in a hydrodynamic bearing through opening of the above-mentioned internal clearance by opening a closing motion valve and leading a lubrication fluid in the chamber of the method of top Norikazu.

[0008] While this invention shortens the time amount which degassing in the vacuum chamber which holds a hydrodynamic bearing by deaerating a hydrodynamic bearing and a lubrication fluid according to an individual takes It is opening a closing motion valve and supplying what was deaerated stirring within a chamber about a lubrication fluid to a dynamic pressure shaft recipient, and makes it possible to be filled up with the lubrication fluid with which internal air

was removed certainly in a hydrodynamic bearing.

[0009] That is, in this invention, using two vacuum chambers divided with the closing motion valve, only a hydrodynamic bearing is held in one vacuum chamber, and a vacuum deairing is performed. As compared with the conventional method of holding a hydrodynamic bearing and a lubrication fluid and performing degassing in a vacuum chamber by this, the time amount which takes the inside of a chamber to reach even a necessary degree of vacuum can be shortened sharply. Moreover, it makes it possible to remove the air of the interior certainly by holding a lubrication fluid in the vacuum chamber of another side, and performing stirring degassing. And the internal clearance between hydrodynamic bearings is filled up with a lubrication fluid through opening by opening a closing motion valve, where the inside of each chamber is deaerated, and supplying the lubrication fluid of a complement in the vacuum chamber which has held the hydrodynamic bearing.

[0010] In this invention, the vacuum chamber of another side in which the lubrication fluid is held here By closing a closing motion valve, after while a hydrodynamic bearing is held and degassing is carried out supplies the lubrication fluid of requirements to a vacuum chamber Since it is not put to atmospheric pressure at the time of exchange of a hydrodynamic bearing, although only the original degassing takes time amount equivalent to the conventional approach, while degassing for every exchange of a hydrodynamic bearing does not almost have the need, it can be combined with performing stirring degassing and can remove the air in a lubrication fluid certainly.

[0011] In addition, in this invention, the gravity based on the differential pressure between chambers and/or the location between chambers (height) can be used by opening a closing motion valve as a means to supply the lubrication fluid in the vacuum chamber of another side in one vacuum chamber.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing. Drawing 1 is the mimetic diagram showing the configuration of the equipment used for the process filled up with a lubrication fluid in a hydrodynamic bearing with the application of this invention approach.

[0013] By opening and closing this closing motion valve 4, the closing motion valve 4 is formed in that piping 3, and the 1st vacuum chamber 1 and the 2nd vacuum chamber 2 arranged in that slanting upper part can make the 1st vacuum chamber 1 and the 2nd vacuum chamber 2 the condition of either a free passage condition or a cut off state while it is open for free passage through piping 3. Moreover, the 1st vacuum chamber 1 and the 2nd vacuum chamber 2 can deaerate the interior with the vacuum pump according to individual (neither is illustrated), respectively. Furthermore, stirring equipment 5 is formed in the 2nd vacuum chamber 2.

[0014] Next, the procedure filled up with the lubrication fluid 7 in a hydrodynamic bearing 6

using equipment [ more than ] is explained. Where it turned at least opening of an internal clearance downward and the hydrodynamic bearing 6 which has an internal clearance is carried on a tray 7 in the 1st vacuum chamber 1, while arranging, the lubrication fluid 8 is held in the 2nd vacuum chamber 2, and where the closing motion valve 4 is closed, the inside of both the chambers 1 and 2 is deaerated. The tray 7 arranged in the 1st vacuum chamber 1 in that case drives the stirring equipment 5 of the 2nd vacuum chamber 2, and carries out stirring deaeration of the lubrication fluid 8 while positioning it so that tip opening of piping 3 may be located in the upper part.

[0015] After degassing is carried out even to each vacuum chamber 1 and the pressure to which the inside of two resembles, respectively and is set beforehand, the closing motion valve 4 is opened. Here, gravity and when the lubrication fluid 8 in the 2nd vacuum chamber 2 distinguishes between both the chambers 1 and 2, in addition to it, it flows to the 1st vacuum chamber 1 side by the differential pressure, and the setting pressure of the 1st vacuum chamber 1 flows in a tray 7, when the closing motion valve 4 is opened an EQC or by making it low a little to the setting pressure of the 2nd vacuum chamber 2. The lubrication fluid 8 which flowed in the tray 7 enters into the internal clearance through opening of a hydrodynamic bearing 6.

[0016] After recognizing by the released time of the closing motion valve 4 set up beforehand etc., the closing motion valve 4 is closed for the inflow to the tray 7 of the lubrication fluid 8 in the 2nd vacuum chamber 2 having reached only the amount which fully fills the internal clearance between hydrodynamic bearings 6. Then, while opening the 1st vacuum chamber 1 wide, making that interior into atmospheric pressure and taking out a hydrodynamic bearing 6 the whole tray 7, where the following hydrodynamic bearing 6 is carried on the tray 7 which got dry like the above, it arranges in the 1st vacuum chamber 1, and degassing of this 1st vacuum chamber 1 is started, and the same procedure as the above is repeated.

[0017] The point which should be noted especially in the gestalt of the above operation The lubrication fluid 8 is held in the 2nd vacuum chamber 2, and stirring degassing is carried out. And this 2nd vacuum chamber 2 Only where degassing is carried out, while the inside of the 1st vacuum chamber 1 is open for free passage to the 1st vacuum chamber 1 concerned through the closing motion valve 4 It is the point that the lubrication fluid 8 does not exist in the interior at the time of degassing in the 1st vacuum chamber 1. By this The time amount which degassing to a required pressure takes the 1st vacuum chamber 1 with the need of repeating an atmospheric pressure and a vacuum deairing object The 2nd vacuum chamber 2 which was sharply shortened as compared with the conventional approach deaerated where a lubrication fluid is held, and has moreover held the lubrication fluid 8 If degassing is carried out stirring the lubrication fluid 8 even to a necessary pressure at the beginning, while it will become unnecessary to almost carry out degassing after that since it sets in process and is not put to

atmospheric air. The air in the lubrication fluid 8 can be removed nearly completely, and the hydrodynamic bearing of the high quality to which air does not exist in an internal clearance is obtained.

[0018]

[Effect of the Invention] As mentioned above, in filling up the internal clearance between hydrodynamic bearings with a lubrication fluid according to this invention, using two vacuum chambers which are open for free passage through a closing motion valve, where a closing motion valve is closed. While arranging and deaerating a hydrodynamic bearing to one vacuum chamber, hold a lubrication fluid in the vacuum chamber of another side, and stirring deaeration is carried out. Since both chambers open a closing motion valve where degassing is carried out, they lead the lubrication fluid in the vacuum chamber of another side into one vacuum chamber and are filled up in a hydrodynamic bearing. The need of putting to atmospheric air whenever it processes one hydrodynamic bearing has while. About a vacuum chamber it can deaerate in the condition that a lubrication fluid does not exist, the time amount for deaerating even to a necessary pressure can be sharply shortened as compared with the conventional approach deaerated where a hydrodynamic bearing and a lubrication fluid are held, and the promotion of efficiency of an activity can be attained.

[0019] Moreover, since being put to atmospheric air for every processing of one hydrodynamic bearing is lost about the vacuum chamber of another side in which a lubrication fluid is held, it becomes unnecessary to almost carry out degassing, and after deaerating even to a necessary pressure at the beginning, a lubrication fluid can be combined with stirring degassing being carried out, and can remove internal air certainly, and the hydrodynamic bearing of the high quality to which air does not exist in an internal clearance can be obtained.

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[Translation done.]

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#### DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the mimetic diagram showing the configuration of the equipment used for the process filled up with a lubrication fluid in a hydrodynamic bearing with the application of this invention approach.

[Drawing 2] It is the mimetic diagram showing the configuration of the equipment used for the conventional process filled up with a lubrication fluid in a hydrodynamic bearing.

[Description of Notations]

1 1st Vacuum Chamber

2 2nd Vacuum Chamber

3 Piping

4 Closing Motion Valve

5 Stirring Equipment

6 Hydrodynamic Bearing

7 Tray

8 Lubrication Fluid

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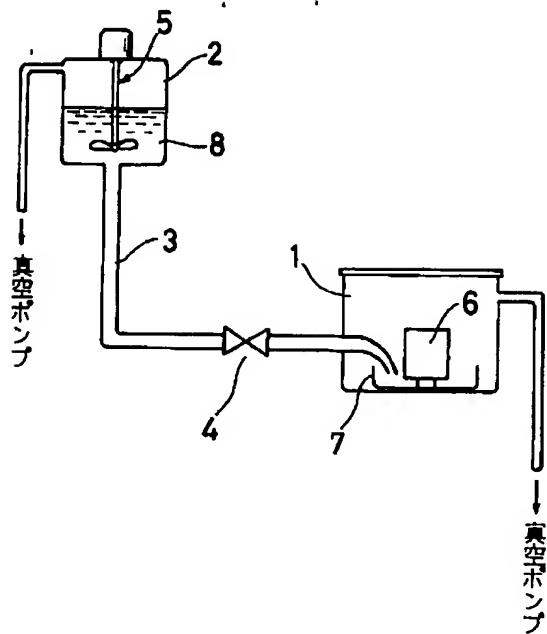
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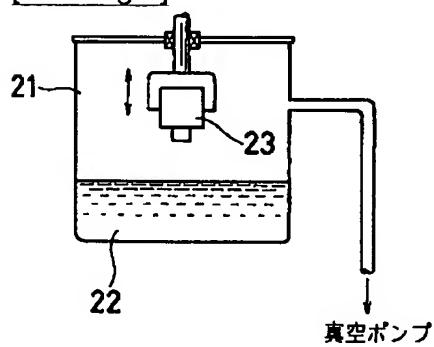
DRAWINGS

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[Drawing 1]



[Drawing 2]



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[Translation done.]

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